Science Update

Technique Squeezes Potential Anti-Cancer Compound From Citrus

A new technique makes possible, for the first time, large-scale extraction of limonoid glucosides from citrus. ARS scientists identified these natural compounds nearly a decade ago. Earlier food industry interest centered on their role in reducing the bitterness of juice. But renewed interest is focused on their possible anti-cancer potential. ARS and Japanese researchers developed the new extraction technique and have applied for patent protection. In the technique, citrus juice or citrus molasses (a thick, dark-brown byproduct of juice-making) passes through a device lined with material that collects up to 100 percent of the limonoid glucosides. Washing out the material with a solvent such as alcohol yields a purified liquid. The Japanese research group has testmarketed a juice beverage with added limonoid glucosides. Shin Hasegawa, USDA-ARS Process Chemistry and Engineering Unit, Albany, California, phone (510) 559-5819, e-mail shinh@pw.usda.gov

Wild Wheat Offers New Mildew Resistance

Wild wheat plants from Iran and Armenia have genes that could let U.S. growers cope better with powdery mildew, a fungal disease. Domestic wheat has some mildewfighting genes that have become less effective over time. Now, for breeders and other researchers, scientists with ARS and North Carolina State University have produced and released three hybrid wheat strains with stronger resistance. Powdery mildew can strike in the Midwest but is more common in the humid Southeast. There, it claims 1 to 3 percent of the wheat crop every year, translating to losses of \$6.5 to \$20 million. Chemical treatments can be costly. The three new hybrids— NC96BGTD-1, -2, and -3—showed resistance to all strains of powdery mildew in 3 years of field tests. To create the hybrids, the scientists pollinated domestic female wheat plants with wild male plants. They nourished the embryos in cell tissue culture to produce mature plants. These were fertilized with pollen from another wild male plant, to retain many of the other desirable traits growers want. The wild wheat came from germplasm collections at ARS and Kansas State University. Steven Leath, USDA-ARS Plant Science Research Unit, Raleigh, North Carolina, phone (919) 515-6819.

Salmonella Gives Up a Few Secrets

What's a Salmonella to do? The bacterium has to leap several hurdles to move from the spleen of a henhouse mouse into the eggs of a chicken. Fortunately, the bacteria rarely succeed. To do so, they must withstand not only the immune defenses of mice and chickens, but also starvation, desiccation, oxygen, heat, and other normal henhouse hazards. Now, researchers are exploring a molecular approach to determine why some Salmonella cells change themselves to improve their odds of infecting chickens and eggs. The change occurs in the makeup of carbohydrates and proteins on the outside of the bacterial cell. Scientists want to determine what environmental conditions trigger this change. The answers could point to promising countertactics. Already, the research has yielded new practical advice: Producers can use mice trapped around the poultry house as sentinels to monitor for the presence of the two Salmonella phenotypes of greatest

concern. Both types inhabit mouse spleens, so the rodents serve as a reservoir for infection. Thanks to the researchers, both phenotypes can for the first time be reliably distinguished. ARS' collaborators included scientists at Stanford University, University of Georgia, and Britain's Cambridge University. Jean Guard-Petter, ARS-USDA Southeast Poultry Research Laboratory, Athens, Georgia, phone (706) 546-3446, e-mail jgpetter@uga.cc.uga.edu

Second Areawide IPM Assault: Corn Rootworms the Target

In June, airplanes began spraying an ARS-developed corn-rootworm bait on corn plants at four Corn Belt sites and one in Texas. Air and ground spraying marked the takeoff of USDA's second areawide integrated pest management (IPM) project and the first to target corn pests. The bait is powdered wild buffalo gourd roots, which contain bitter cucurbitacin compounds that stimulate feeding by rootworm beetles. The pests won't enjoy their last meal for long, for mixed with the bait is carbaryl insecticide. But its per-acre active ingredient is 95 to 98 percent less than that in conventional spray. If the bait works over large areas, expanding its use to the entire Corn Belt could cut corn insecticide use in half. USDA's first areawide IPM project began in 1995, aimed at codling moths in Pacific Northwest apple and pear orchards [See "With IPM, Bigger Areas Are Better," Agricultural Research, May 1997, pp. 4–8]. AR magazine has scheduled a feature story on the rootworm project for October 1997. Larry Chandler, USDA-ARS Northern Grain Insects Research Laboratory, Brookings, South Dakota, phone (605) 693-5239, e-mail lchandle@ngirl.ars.usda.gov